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## **Export experience counts: Exploring its effect on product design change**

### **Abstract**

In this paper we explore how managers' export experience can affect the change in product design following changes in perceived past performance. Using data from 519 Portuguese exporters we find that performance improvement will encourage safe decision making in which firms either will not change the product design or will change it in a way that makes it more similar across the product range. However, when managers' export experience is greater they encourage change in ways that could support product differentiation. The abilities of experienced managers to read the market, i.e. to interpret changes in performance and translate them into product specifications, help explain these findings. We contribute to the literature in two ways. First, we explore the relationship between past export performance change, product design, and managers' export experience. Second, we identify specific kinds of design changes that firms adopt in response to changes in different dimensions of organizational performance.

Based on our findings we would recommend to new product development managers to consider both managers' export experience and the dimension used to measure performance when evaluating calls for standardizing the design by export managers. Our findings suggest that such calls could be driven by short-term gains in export performance. Furthermore, we would also emphasize the need to routinely capture information from experienced export managers to ensure that it is considered in future decisions about design changes.

**Keywords:** Product design change, export performance, management experience

## **Introduction**

Managers of exporting organizations often try to promptly interpret indications about the success of a product's design while considering a diverse and complex set of needs (Colder, 2000; Wouters et al., 2011). For instance, when Mattel first introduced its well-known Barbie doll in the Japanese market it failed to change the design appropriately to account for local customs and tastes. Following its initial decline in performance, Mattel sought the advice of an experienced local company that helped them adapt the design to the Japanese market by altering Barbie's body shape to appeal more to the Japanese child's sense of aesthetics (Pollack, 1996).

As the Barbie example illustrates, product development and export managers need to be able to react quickly to changing performance by adopting their product designs (Wouters et al., 2011) appearances (Truong et al., 2013), and strategies, while taking into account local customs, sensitivities, needs (Frey et al., 2013), and customers' perceptions (Townsend et al., 2013). This belief is supported by organizational learning theory, according to which managers tend to look at past performance as a signal of success or failure in order to determine managerial action (Cyert and March, 1963; Levinthal and March, 1981; Lages et al., 2008). The outcome of such action depends on the management's interpretations of the changing performance and may, as a result, lead to changes in the products' design (Cavusgil et al., 1993; Calantone et al., 2004).

Managers' interpretations and reactions to changing performance are likely to differ depending on the diagnostic systems their organizations have in place (McCarthy and Gordon, 2011) and their ability to accordingly and promptly interpret the reasons behind the change. This ability depends on several contextual factors, including their experience, which they use to support their decision making (Levinthal and March, 1981; Cua et al., 2001; Füller et al., 2011) and to navigate through design tradeoffs (Belecheanu et al., 2006).

Organizational learning theory also suggests that experience is important and helps to improve innovation performance (Levitt and March, 1988; Alegre and Chiva, 2008). Although not the only source of learning, learning by doing is one of the most important sources of organizational learning (Nelson and Winter, 1982). When organizations are able to remember by doing they become better versed in the tacit aspect of knowledge (Nelson and Winter, 1982). In other words, tacit knowledge is acquired through experience (Luo and Peng, 1999).

Export experience, which is the focus of this study, helps make sense of country-specific tacit information and apply it to the creation of knowledge (Subramaniam and Venkatraman, 2001; Lages et al., 2008). Indeed, international management experience has been found to influence several organizational characteristics such as the firm's behavior (Reuber and Fischer, 1997; Ignatius et al., 2012) and its ability to form alliances (Eisenhardt and Schoonhoven, 1996), ultimately affecting its approach to decision making. Different levels of international management experience are thus likely to influence the interpretations, reactions, and recommendations about how the product's design should be changed.

The present study uses arguments from organizational learning to develop and empirically validate a theoretical model that seeks to explain how managers' export experience would influence their decision to adapt the designs of the products offered as a result of a change in perceived past performance. To the best of our knowledge there is no research that explores the moderating role of export experience within the context of new product development, and our work thus provides a fresh look at the performance-design relationship. Given the lack of theory aimed at predicting specific kinds of strategies that firms adopt in response to changes in organizational performance (Shinkle, 2012), and considering that to our knowledge no research has explored this issue within the context of product design, we offer a more theoretically founded explanation for these relationships.

The paper is structured as follows. In the next section we present the literature review and develop six hypotheses that explain how changes in performance affect design change and the role of managers' export experience. This is followed by methodology, implications of our findings for theory and practice, and limitations and directions for future research.

## **Literature review**

Product development managers make choices about the design of their products, which may be triggered by several internal and external factors and result in expectations about their performance in the market place (Kessler and Bierly, 2000; Kleinschmidt et al., 2007) and differing decisions about the degree of outsourcing (Zirpoli and Becker, 2011). Such choices are often linked with the product's performance in the marketplace, and subsequently the organizational performance (D'Ippolito, 2014). From organizational learning theory we know that expectations, which are often converted into performance goals, are compared with performance outcomes (Lant and Mezias, 1992). When performance outcomes do not align with expectations, managers engage in a process of trial and error seeking to associate inputs (e.g. product design) with outcomes (e.g. performance) (Cyert and March, 1993, Levinthal and March, 1981).

A considerable amount of research in organizational learning has focused on the interactive process of trial and error (e.g. Sullivan and Nonaka, 1986). According to this perspective, managers work to identify associations between behaviors and outcomes (Cyert and March, 1963; Levinthal and March, 1981). Specifically, it has been argued that managers seek to identify associations between behaviors that result in positive or negative outcomes, repeating those behaviors that are linked with positive and eliminating behaviors that are linked with negative (Sullivan and Nonaka, 1986).

Within the context of export performance and design change, which is the focus of this study, perceived performance in an export market would trigger a process in which positive performance reinforces the original expectations and negative performance leads to their reevaluation. Furthermore, managers' interpretations of the changes in performance of the product design would vary depending on their experience, possibly triggering different types of responses.

The way performance is measured, perceived, and understood by managers therefore influences the decisions they take to shape their product design strategies (McCarthy and Gordon, 2011). As performance can be multidimensional, different dimensions and definitions can trigger different responses. Given that the concept of interest in this study is export experience, we have chosen to focus on the perceived performance of the export venture as opposed to that of the organization as a whole.

We define, and later measure, export performance across three dimensions: change in export performance satisfaction, change in export intensity, and change in achievement of export objectives (Cua et al., 2001). Export performance satisfaction is a psychological variable (an affective state) with respect to the exporting activity (Flynn et al., 1990; Flynn et al., 1999). The measures of export performance satisfaction in the present study account for satisfaction with export sales volume, sales revenue, profitability, and market share. The second aspect of export performance is export intensity. Export intensity refers to the proportion of production output to exports, measuring the percentage of exports against the firm's total sales and profits (Ketokivi and Schroeder, 2004). This measure indicates the weight of export operations with regard to overall organizational performance. The third aspect of export performance is performance achievement, i.e. meeting of predetermined goals. In line with the work of Devaraj et al. (2004), this refers to the extent to which firms achieve their export objectives regarding different measures, such as sales volume (unit sales), sales revenue,

profitability, and market share. The process of establishing a new venture would probably commence with the definition of a series of business objectives, which will also include export performance expectations.

### *Export performance Satisfaction*

Past performance indicates how effective prior decision making and business activity has been and how it might influence managers' and firms' behavior in the future (Cua et al., 2001; Lages et al., 2006; Lages et al., 2013). On one hand, when performance is perceived to be poor, there is increasing pressure to improve by taking decisions that strategically reposition the firm (Lant and Mezias, 1992; Lant and Milliken, 1992). Disappointing performance indicates that past strategies may have been inappropriate. Consequently, managers move into a problem-motivated search, attempting to change their managerial practices to better respond to the environment (March and Simon, 1958). Performance decline is therefore associated with greater levels of organizational and strategic change (Boeker, 1997).

On the other hand, when firms perform well, managers tend to be reluctant to discard the strategies and products that led to past successes (Cua et al., 2001). The positive performance reinforcements lead them to search less for information and, after periods of successful performance, organizations reduce their intelligence effort, and fail to process the information received (Miller, 1994). Performance improvement is therefore associated with complacency and possibly resistance to implementing radical changes.

Although the above discussion focuses on the impact of performance on changes at the organizational level, it can be extended to both product design (Carayannis, 1999) and export performance levels. The performance of an organization, and more specifically that of an exporting venture, depends on the performance of its products in the marketplace. When the

performance of the exporting venture improves, managers are less motivated to implement extensive changes to further adapt the product to the local market. When export performance falls, there is a greater incentive to modify the product's design in original ways.

Based on the above arguments, we do not expect improving export performance satisfaction to lead to radical and novel changes to the design of the product that is offered to the export market. However, we do expect efforts for improved efficiencies and economies of scale to gradually standardize product designs between the two markets (local and export). As export performance improves, managers in both home and export markets are likely to increase optimization and process management to save costs and sustain their current success. Such optimization efforts usually strive to decrease variation and increase the volume of products (Devaraj et al., 2004). As a consequence, products offered in the two markets become more similar. This leads us to the first hypothesis:

*Hypothesis 1: Firms are likely to respond to improvement in export performance satisfaction by making their product designs similar between the two markets.*

### *Export Intensity*

An increase in export intensity indicates an improvement in export sales and profit relative to that of the home market. Literature on aspiration level learning suggests that risky organizational changes are more likely to take place when motivation, opportunity, and capability are all present (Greve, 1998; Baum et al., 2005). Managers use historical and social aspiration levels to make decisions to interpret the reasons for their organization's performance. When this performance is perceived to be successful the actions and routines that have led to it are reinforced, which may in turn lead to a reduced effort for searching for opportunities to improve performance (Kim et al., 2009). When performance is above the



aspiration level firms are expected to continue with the *status quo* to avoid actions that might result in performance below aspiration, take fewer risks, and strive for only slight improvement of performance (Cyert and March, 1963). As the effort for searching for improvements is reduced, existing solutions are reinforced and potentially expanded across other organizational functions.

Expanding the above argument to export intensity and the design of the product of the export market suggests that when the export intensity increases, the search effort of managers to improve the product design lessens. When this is the case, the success of the product design on the export sets a reference point of performance, and probably reduces the manager's appetite for taking risks with the product's design. Search processes would be limited toward known successes with similar products. Managers in the home market would therefore opt for changing the product design of the home market in ways that would emulate the success of that in the export market, making the two designs more similar.

The above arguments lead us to the second hypothesis:

*Hypothesis 2: Firms are likely to respond to improvement in export intensity by making their product designs more similar between the two markets.*

### *Achieving Objectives*

A typical new product development process gradually transforms new ideas into marketable products using stages and decision making gates (Cooper, 2001). The traditional process of doing so requires meeting predetermined criteria about the feasibility of the project and its return on investment (Cooper and Kleinschmidt, 1987) and may increasingly involve external specialized organizations as well (Chiesa et al., 2004). Criticisms of this linear process, particularly ones linked with reduction of an organization's ability to innovate (Bonner et al.,

2002) and later with the allocation of resources (Keupp and Gassmann, 2013), have led to the development of several variations on how decisions about new products are made. Nevertheless, for several organizations that operate commercially in more than one market the development of a new product would need to meet several stringent objectives about its export performance (Cooper and De Brentani, 1984; Subramaniam and Hewett, 2004).

As with new products, implementing design changes in products offered by the export venture requires meeting similar stringent objectives about its performance in the export market. When a manager of the export venture suggests a change to the product, he or she needs to build a business case explaining what the tradeoffs are (Belecheanu et al., 2006), and how it will improve performance and help meet the export venture's objectives. Such changes are therefore likely to be relatively difficult, lengthy, and potentially risky. One might therefore expect that when the original objectives of the export venture are achieved, resistance to change will be greater and the product design will not be modified.

The above rationale is also supported by the organizational learning and strategy bodies of literature, according to which, managers have a set of their own goals that are regularly assessed against their organization's performance outcomes (Lant 1992; Lant et al. 1992). Any discrepancies between their goals and their organizations' goals influence their action and decision-making (Levitt and March 1988; Lant and Mazias 1992). They look for associations between firm behaviors that have resulted in positive or negative outcomes, repeating the ones associated with positive outcomes and eliminating those associated with negative (Cyert and March 1963, Levinthal and March 1981; Sullivan and Nonaka 1986). Therefore, when managers meet export performance objectives, they make decisions that reinforce the implementation of the current approach. This is because managers believe that their identification of the underlying associations in the market that drive export performance

is correct and that their strategy to stimulate desired outcomes is effective. This leads us to the third hypothesis:

*Hypothesis 3: Firms are likely to respond to the achievement of the objectives of the exporting venture by not changing the product design.*

*The moderating role of managers' export experience on export performance satisfaction and design*

Experiential learning is particularly useful in overcoming cultural barriers, and as a result, more experienced managers are also more likely to have the required expertise to make the proper adjustments to the environment (Lant and Hurley, 1999). Local managers possess the required knowledge to improve the information of the product at the local level (Subramaniam, 2006). Translating this knowledge into specific design requirements calls for its codification and transfer through the organization's formal and informal communication channels, a complicated task for managers with less export experience. When changes in export performance indicate a need for change in product design, less experienced managers are more likely to recommend changes that are more closely aligned with the company's existing home products.

There is another reason why less experienced managers are more likely to change toward the safer option of making it more similar to the design of the home market: the "stickiness" of the relevant knowledge (Szulanski, 1996). Knowledge about the product is often embedded in the various subunits and export venture, and difficult to transfer across geographical boundaries as a result (von Hippel, 1994). Less experienced managers are less likely to know how to find such information and consequently how to communicate it to the new product development team.

During the new product development process several decisions about how consumers will respond to the new product are made (Ignatius et al., 2012). Assuming that these products were developed for the home market first, the point of reference for any decisions will be that market. Less experienced managers, who probably lack the confidence and knowledge to make meaningful adaptations to the design, probably respond to perceived export performance changes by making decisions using information developed in the home market. As a result, changes in export performance will trigger changes in the design that will make the product more similar between the two markets when management is less experienced. This leads to the fourth hypothesis:

*Hypothesis 4: Managers' experience moderates the relationship between export performance satisfaction and product design change in such a way that improvement in export performance satisfaction encourages firms to make their product design even more similar between the two markets when their exporting managers are less experienced.*

#### *The moderating role of managers' export experience on export intensity and design*

Export experience is likely to provide managers with the necessary confidence to make any changes to the product design. When export intensity is increasing, less experienced managers will probably lack the confidence to implement changes. As export intensity is increasing, total sales volume and value of the main exporting venture will be increasing on a yearly basis. A straightforward interpretation of this increase is that the product is performing well in the new market and as a result no changes are needed. Less experienced managers may support the rationale of their decision-making with data collected from, and assumptions made for, the home market. Lack of experience is related not only to costs, but also to the options considered by decision-makers (Hutzschenreuter et al., 2007). Therefore,

less experienced managers generate fewer novel responses as a result of changing export performance. As export intensity changes they make decisions about changes in the product design that will ultimately make the design more similar to the home market.

More experienced managers, however, are able to understand tacit and subtle variations on the product's performance relative to the home market. More importantly, they will have the confidence to take actions in a way that they can benefit from such variations. Action is likely to lead to the introduction of new product variants, and consequently to differentiation between the design of the home and export markets. This leads us to the fifth hypothesis:

*Hypothesis 5: Managers' experience moderates the relationship between export intensity and product design change in such a way that improvement in export intensity encourages firms to make their product design more differentiated between the two markets when their exporting managers are more experienced.*

#### *The moderating role of managers' export experience on objective achievement and design*

When developing our third hypothesis we argued that as the objectives of the export venture are being met, resistance to change is greater, and the product design will not be modified. However, according to the arguments we developed for hypotheses 4 and 5, the confidence that is generated by experience should help to overcome the resistance to change. While the understanding of key strategy issues is normally seen to be complex by less experienced managers (Cavusgil and Zou, 1994), more experienced managers tend to have a better understanding of the characteristics of the foreign markets, and are therefore in a position to better adapt the strategy to the requirements of the local markets (Johanson and Vahlne, 1977; Douglas and Craig, 2011). Furthermore, more experienced managers are likely to

consider rules as checklists and guidelines rather than strict regulations (Christiansen and Varnes, 2009).

As the objectives set for the export ventures are being met, the original assumptions about how the product will perform in the new market are being confirmed. When managers are less experienced, there is less incentive to challenge those assumptions. Less experienced managers are likely to follow the rules set by the new product development process more closely (Christiansen and Varnes, 2009). On the other hand, more experienced managers are able to better understand the intrinsic ways in which the export market is operating and to offer improvements to the product's design. This leads to the sixth hypothesis:

*Hypothesis 6 Managers' experience moderates the relationship between the achievement of the objectives of the exporting venture and product design change in such a way that achievement of the objectives encourages firms to make their product design more differentiated between the two markets when their exporting managers are more experienced.*

A summary of the six hypotheses developed is included in Figure 1.

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Insert Figure 1 here

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## **Method**

To examine the impact of changes of the performance of the export venture on product design we collected data via a self-administered questionnaire sent to Portuguese exporters.

Respondents were first asked to name the main export and the main importing country of

their main export (see Table 1). They were then asked to respond to the remaining questionnaire in relation to this venture.

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INSERT Table 1 HERE

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### *Measures*

The dependent variable of this study is change of design of the products offered in the home market relative to that offered in the export market and vice versa. Changes in a product's design could take many forms and could vary from something as simple as a change of color to a change in its underlying configuration, as with the Barbie Doll mentioned in the introduction. Furthermore, the degree to which such change is considered substantial enough depends on the context and the perception of the organization. To capture the above we opted for a perceptual measure of product design change. The reason for this is that managers responsible for such changes are best positioned to judge whether the change is substantial enough or not. Respondents were therefore asked to report whether the design of the product offered in the export market from the previous to this year had been changed in a way that made it more similar (1), more different (2) to the home market, or not changed at all (0). The dependent variable was therefore categorical and could take three possible values, as shown in Table 2.

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INSERT Table 2 HERE

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There were four independent variables: three related to export performance and one to the managers' export experience, as shown in Tables 3 and 4.

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INSERT Table 3 HERE

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INSERT Table 4 HERE

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### *Pre-test*

Before conducting the survey the questionnaire was tested in three stages (Cua et al., 2001). During the first stage the survey instrument was developed in English by combining pre-existing measures from the literature. This was then translated into Portuguese and then back to English by a different researcher. The resulting questionnaire was then reviewed by four other researchers and 15 managers involved in export operations. This assured alignment with managerial views and interests (Madsen, 1998) and comprehension of the measures.

### *Data collection*

The database of the Portuguese government's export promotion agency randomly generated a sample of 2,352 firms, with named individuals responsible for foreign operations. Of these, 519 usable questionnaires were returned (22% response rate). To increase variance and generalizability of the results, we considered exporters in multiple industries and regions. Respondents held positions such as president, marketing director, managing director, and exporting director. Descriptive statistics and correlations are included in Table 5.

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INSERT Table 5 HERE

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To evaluate possible non-response bias, we categorized the valid questionnaires into early and late responses (Armstrong and Overton, 1977). As explained by Armstrong and Overton (1977), those who respond later in a survey do so because of the increased stimulus and are thus expected to be similar to non-respondents. We therefore considered the early respondents as the first 75% of the returned questionnaires and compared the means of all variables. No significant differences were found, suggesting that nonresponse bias is not a serious threat. Finally, we examined our data for outliers and visually inspected the histograms and scatter plots for each of our dependent and independent variables for normality, linearity, and homoscedasticity (Hair et al., 2006). No violations of the key assumptions were detected.

### *Control Variables*

To capture any industry related effects we included the following control variables. First was price competition. A direct comparison with competitors allows managers to assess their product's competitive advantage (Day and Wensley, 1988). Consequently, it is expected that the more intense the price competition is in foreign markets, the more a company will tend to change the design of its products to save costs and to offer additional value to the customer. Second was company size. Larger organizations tend to have more complex procedures, formal structures, and possibly be more decentralized than smaller firms (Vickery et al., 1999). As a consequence, they are more likely to have clearer new product development procedures, marketing strategies, and more formal approaches to measuring performance. Furthermore, larger organizations are likely to have larger market shares and greater control over the competitive environment (Dean et al., 1998), which could lead to their home product

being better known to the export market, thereby influencing the decision to change or not the product design. Size was measured on a scale from 1-6, where respondents were asked to report the category in which the size of the organization belonged with the smallest including 1-9 employees and the largest including over 500. As shown in Table 5 there was an even spread of organizational sizes, including some large organizations.

The third control variable was the sales value of the export venture. A large value of exports could provide a considerable incentive to change the design of the product to meet increasing demand. In other words, if the sales value increases significantly, then managers' actions could be skewed toward satisfying the export market.

#### *Common method bias*

To minimize common method bias, the study engaged both of the procedural remedies that Podsakoff, et al. (2003) suggest, as well as *ex post* empirical testing. We employed three *ex post* approaches. First, we carefully examined the correlation matrix for suggestions of multicollinearity. The lack of highly correlated constructs (see Table 5) suggests that common method bias is minimal. Second, Harman's one factor test was used - revealing a very poor fit for the single-factor model, suggesting an absence of common method bias. Third, we used objective data for comparison purposes.

In addition to the data collected from the survey, we drew upon objective data from annual reports and compared these to the survey responses. Unfortunately, due to the sample combination (public and private firms), such data were available for only a limited subsample, and even for these firms, the objective data refer to the overall firm, as opposed to the specific export venture. However, since the survey also collects information on sales and employment at the firm level, a comparison is possible between the questionnaire responses and the objective data.

Compilation of data on sales and employees utilizes 8 and 6 point interval measures, respectively. Coding of the sales and employment data from the annual reports uses the same intervals, revealing correlations between the subjective and objective measures of 0.86 and 0.93, respectively (sample sizes of 155 and 82). In addition, while objective data on the firms' export ventures were unavailable, Table 6 reveals that the correlations between the objective percentage growth in overall firm sales and the corresponding perceptual export-venture sales performance items are positive and significant. This increases considerably when restricted to firms for which the export venture accounts for at least 60% of total firm sales value. Both the procedural and empirical approaches suggest that common method bias does not significantly influence our results.

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INSERT Table 6 HERE

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## **Analysis and results**

The measure of change in product design was a categorical variable, taking three possible values: (0) when the product design did not change between two years ago and the previous year (76% of the firms in the sample), (1) when the product design became more similar between the two markets (i.e., became more standardized (10%)), and (2) when the product design became more differentiated between two markets (14%). The goal is to investigate whether the observed change relates to the observed change in prior export performance and the moderating effect that export experience might have. Because we wish to measure the influence of the covariates on the different directions of change, the study uses multinomial logistic regression. This type of regression is used to determine membership to more than one category (Field, 2009), as is the case in this study. Multinomial logistic regression

calculates the probability that the outcome will belong in one of three or more categories. It does so by comparing the probability of belonging to a group or outcome against a baseline category. In this case, the baseline category is the “no-change” case (value 0). Thus, the reported coefficients indicate whether changes in one specific covariate change the probability that the product design becomes more (or less) adapted. The use of a one-year period to assess product design and export performance is a relatively novel approach in new product development and innovation studies, but a well-established approach in strategy research (McDonald and Westphal, 2003).

### *Results*

Table 7 reports the regression results. The top panel of the Table shows the influence of the independent variables upon change to a more standardized product design (more similar between the two markets), and the bottom panel shows the corresponding impact upon change to a more adapted product design (more differentiated between the two markets). Table 7 also includes two models. Model 1 is the base model, which includes only the control variables, and model 2 includes the main effects of the measured variables and their interactions.

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INSERT Table 7 HERE

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The first three hypotheses predicted the direct effects of changes in export performance on the probability that the design will change. The results in model 2 indicate that when the performance of the export venture becomes more satisfactory (PS), the probability of making

the design more similar between the two markets increases ( $B=4.211$ ,  $p<0.05$ ). That is, as the performance becomes more satisfactory, the odds of the design becoming more similar between the two markets (rather than not changing at all) is 4.211.

In terms of the second hypothesis, which predicted that firms are likely to respond to increases in export intensity by making their product design more similar between the two markets, the results show that the coefficient does not reach statistical significance, although it is in the right direction ( $B=0.289$ ). In terms of the third hypothesis, the results indicate that as export performance increases from one year to the next firms are likely to respond by leaving the design unchanged ( $B=-3.045$ ,  $p<0.10$ ). The reader is reminded that the reference category is *no modifications*. A negative coefficient on the regression indicates that the probability for a non-response increases. Therefore, there is support for the third hypothesis.

The second group of hypotheses predicted the moderating effects of managers' export experience. The fourth hypothesis predicted that firms are likely to respond to improving export performance satisfaction by making their product design more similar between the two markets when their exporting managers are less experienced. As shown in Table 7, the coefficient of the interaction is negative and statistically significant ( $B=-1.223$ ,  $p<0.05$ ). Put differently, as the measure of experience decreases, managers are more likely to respond to a positive export performance change making the product design more similar between the two markets.

The fifth hypothesis predicted that more experienced managers will respond to increasing export intensity by making the product design more differentiated. As shown in the bottom panel of Table 7, the coefficient of the interaction variable ( $EI*EE$ ) is positive and statistically significant ( $B=0.357$ ,  $p<0.05$ ). Put differently, as managers become more experienced, the probability of responding to increasing export intensity by making the products between the two markets more differentiated increases.

The sixth and final hypothesis predicted that firms are likely to respond to the achievement of the objectives of the exporting venture by making the product design more different between the two markets when their managers are more experienced. The coefficient of the interaction variable (AO\*EE) is positive and statistically significant ( $B=0.832$ ,  $p<0.10$ ), indicating that the hypothesis is not supported. The results indicate that as managers become more experienced, the probability of responding to the achievement of the objectives by making the two products more similar increases, the opposite to what was predicted in hypothesis 6.

Two possible explanations for this result, both of which could lead to an effect opposite to the one we predicted, are the following. The first relates to the “givens” and space of options that an experienced manager has (March and Simon, 1958). An experienced project manager would have worked in a similar environment for a relatively longer period of time. Such experience may generate confidence and better understanding of the rules (Christiansen and Varnes, 2009), as we discussed in the hypotheses development section, but could also constrain the manager’s creativity (Reuber and Fischer, 1999; McIntyre et al., 2003). Newer and less experienced managers could think in a more risk adverse way, but might also be able to offer novel solutions and directions for product design as they might be more inclined to look externally for new product solutions and opportunities for learning (Kessler and Bierly, 2000). Therefore, as the objectives of the export venture are being met, experienced managers will look at the performance of the product in the home market, and if it is doing well there, it might encourage change that makes the two more similar. Less experienced managers will not necessarily use this benchmark or reference point and simply opt for changing the product according to the needs of the local market only. As a managing director of an exporting company explained to us when we discussed our results with him:

*I now know the rules of the game and I know which buttons to press. When I was new to this I was always at odds with my parent company because they would not accept my proposed changes to the specifications of (product). I now know how to sell it without necessarily making any changes.*

The second explanation relates to the nature of the performance measure, i.e. achievement of objectives. As explained above, achievement of objectives relates to the perceptions of managers that the original financial objectives set by the organization for the exporting venture are being met. These objectives would be set by the home organization and be associated with the criteria used to evaluate the progress of the product development process. Regardless of the level of export experience, managers seek to achieve the objectives set by their organizations, argument belief that is in line with the findings of McCarthy and Gordon (2011), who found a strong link between R&D goals and the use of different types of control systems. More experienced managers, on the other hand, are more familiar with their organization's systems and products. They are therefore more able to fully utilize the product information they have from the two markets the company operates in to maximize their financial performance. Any design changes they recommend as a result of meeting the objectives in either the home or export markets would utilize the current market information of the two products and eventually make them more similar.

The above explanation does not imply that experienced managers would not pursue the development of new products, but that these would be significantly different from those that are already on offer. Because the objectives are being met from one year to the next, experienced managers will concentrate their efforts on maximizing revenue by directing the product development process toward incremental changes that make the two products more similar, and thus benefit from economies of scale. Given that they have the confidence to make changes to the product, as we argued for the remaining hypotheses, they will still make

changes, but these will be directed toward more radical innovation not necessarily captured by our measure. Our data and results are not sufficiently fine-grained to fully support this assertion, but they point in this direction.

## **Discussion and Conclusions**

Our results support the underlying notion that when performance improves, decision-making leans toward safer options (Lant and Hurley, 1999), and they show that this relationship depends on a) the dimension of performance being used and b) the managers' export experience. In the case of the former, different aspects of performance trigger different types of design change. Perceived improvements in export performance lead to the designs in the two markets being more similar (Hypothesis 1), whereas perceived achievement of objectives leads to no change (Hypothesis 3). Less experienced managers are therefore more likely to opt for safer design options, i.e. to either not change the design at all or to change it in ways that make it more similar to the home market. More experienced managers, on the other hand, are likely to influence the decision in ways that could lead the design of the products to be more different between the markets the organization is operating in.

Our results do not show a significant association, however, between changes in export intensity and change in product design (Hypothesis 2). Changes in the weight of export operations with regard to the overall organizational performance therefore do not necessarily lead to changes in the product design. Although the success of the product in the export market would set a benchmark of performance, this does not significantly encourage managers to change the design in ways that make it more similar to the two markets. This is an area in which more research is needed to identify the reasons behind it and the actual responses of managers.



A final point of our findings relates to the different features of export performance that we have used. The theoretical development section and the results clearly indicate that different aspects of export performance and managers' perceptions of this performance trigger different reactions, in this case, changes in design. Each of these is likely to trigger different types of responses. Export performance is therefore a multidimensional concept, which could be interpreted in different ways and lead to different responses by managers.

We contribute to the literature in two ways. First, by exploring the relationship between past export performance change, product design, and managers' export experience we provide a fresh look at the performance-design relationship. Second, by predicting specific kinds of design changes that firms adopt in response to changes in different dimensions of organizational performance (changes in product design), our work pertains to organizational learning theory. Changes in past performance can be an important antecedent of product design change.

### **Limitations and directions for future research**

The survey was conducted with Portuguese companies. There may be some country-specific characteristics that have affected the results and this might limit some of the generalizability of our conclusions. However, neither the development of our hypotheses nor the analysis of the data were country-specific, and this reduces the possibility of cultural or other national factors influencing our results. Still, we cannot ignore that possibility. Repeating this study in a different country might confirm our results and eliminate the possibility of a country effect on our findings.

Further, the research context limits the generalization of the findings to some degree. The results cannot be automatically generalized to larger firms or firms based in other countries without further evidence because the research context involved only one country and mostly

small to moderate size firms (only 7.5% of the companies have a sales value of over €35m, and 4.8% have more than 500 employees). Extending beyond these limitations, this research provides a foundation for future research endeavors to explore the empirical link between past performance improvement and current design change. However, research still needs to investigate this link systematically and thoroughly. By better understanding how design strategy is affected by past performance in the short term, we provide insights into the building blocks of long-term strategy.

An additional possibility for future research relates to the lack of support for hypothesis 2 and the opposite finding regarding hypothesis 6. For the latter we offered alternative explanations for these findings in the discussion section of the paper. Future studies could examine these empirically. We would recommend to future researchers to measure the level of novelty of the products offered and then to explore whether this changes when past export performance changes. If our explanation is correct, then following the achievement of objectives, less experienced managers would encourage the development of relatively more novel products. We also suspect that adding such additional measures could help shed some more light on the reasons why hypothesis 2 did not reach statistical significance.

A final avenue for future research is to explore any non-linear relationships between changes in export performance and the decision to change the design, such as the one found by Guan and Ma (2003). Small changes in export performance could encourage cautious traditional moves. However, greater changes of export performance could trigger more significant changes. Testing of such a possibility was outside the scope of our work, but there is good reason to expect that such a relationship exists, and investigating it could uncover some additional theoretical explanation about the impact of export performance on design changes.

## **Practical Implications**

Managers are typically concerned about the performance of their export operations because they see the exporting activity as a way to stabilize cyclical demand, reduce overall operating costs, extend the product life cycle, sell firm's excess capacity, and to gain international knowledge to better operate in the domestic market and experience to enter into other forms of internationalization. Our study presents a novel approach of using export performance improvement as an independent variable. By doing so, we provide managerial guidelines about how companies align their product design strategy to their export experience and past performance. Our findings indicate that export performance improvement will promote safer decisions in which firms either will not change the product design or will change it in a way that makes it more similar across the product range. However, when the capabilities of experienced managers come into play, they encourage change in ways that could support different product design across markets.

In light of our findings there are two pieces of advice we would give to organizations with export ventures. The first relates to screening the recommendations that come from export managers regarding changes in the product's design. Our results indicate that these will vary depending on the managers' perceived past export performance, but more importantly depending on the export managers' experience. New product development managers could therefore take experience and the dimension used to measure performance into consideration when evaluating any calls for standardizing the design by export managers. Our findings suggest that such recommendations could be driven by short-term gains in export performance.

Our second piece of advice has to do with the rationale of the 6<sup>th</sup> hypothesis, which was not supported. If this rationale is correct, more experienced managers would be relatively more able to fully utilize the product information they have from the two markets the company operates in to maximize their financial performance. Our advice to R&D and new product

development managers and their organizations is therefore to include filters in the product development process that ensure that such information is routinely captured and that it is considered in future decisions about the design of the product.

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## Tables and Figures

**Table 1 Definition of Main Exporting Venture**

Please select the Main Export Venture of your firm (the main product or group of products exported by your company to the most important foreign market in terms of sales revenue), which will be the focus of this questionnaire:

- a) the main export of your firm (product or group of products) in terms of sales revenue \_\_\_\_\_  
 b) the main importing country of your firm's main export in terms of sales revenue \_\_\_\_\_

**IMPORTANT:** You have just defined the Main Export Venture (which this questionnaire is about).

**Table 2 Dependent Variable: Change in Product Design (DesignChange)**

**Question:** Consider the main export venture. When comparing the domestic market with the market that imports the most from your company, to what extent was the design changed from the previous year to this year?

- DesignChange = 0, if design did not change from the previous year to this year;  
 DesignChange = 1, if design this year is more or much more similar to what it was in the previous year;  
 DesignChange = 2, if design this year is more or much more differentiated from what it was in the previous year.

**Table 3**

### Performance Measures' Change

#### Change in Export Performance Satisfaction

How satisfied are you with the results of your main export venture from the previous year to this year?

1=Much Worse in previous year than two years ago; 2= Worse ...; 3= Equal to two years ago;  
 4= Better ...; 5=Much Better in the previous year than two years ago

- a) Export sales volume (unit sales)  
 b) Export sales revenue  
 c) Export profitability  
 d) Market share in the main importing market  
 e) Overall export performance

#### Change in Achievement of Export Objectives

How well did your company achieve the following objectives for the main export venture from

1=Much Worse in the previous year than two years ago; 2=Less Satisfied ...; 3=Equally Satisfied;  
 4= More Satisfied ...; 5=Much Better in the previous year than two years ago

- a) Export sales volume (unit sales)  
 b) Export sales revenue  
 c) Export profitability  
 d) Market share in the main importing market  
 e) Overall export performance

#### Change in Export Intensity

With regard to your main export venture, to what extent did the following change from two years ago to the previous year?

1= Largely Decreased from two years ago to the previous year, 2= Decreased ...; 3= No change;  
 4= Increased ... 5= Largely Increased from two years ago to the previous year

- a) Percentage of exporting venture to total sales volume (unit sales)
- b) Percentage of exporting venture to total sales revenue
- c) Percentage of exporting venture to total profitability

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**Table 4 Export Experience**

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Consider the people involved in your main export venture during the past year (Year t-1). How would you classify their degree of professional exporting experience?

1=None; 2= Little; 3= Moderate; 4= Considerable; 5=Substantial

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**Table 5 Descriptive Statistics and Correlations, alpha Coefficients**

	$\alpha$	Mean	S.D.	DC	OS	VEV	PC	EE	PS	EI	AO
Design Change (DC)		0.36	0.705	1							
Organizational Size (OS)		3.61	1.367	0.076	1						
Value of the Exporting venture (VEV)		4.6	1.785	0.049	0.465**	1					
Price competitiveness (PC)		3.00	0.828	0.158**	0.053	0.060	1				
Export Experience (EE)		3.61	0.842	-0.038	0.130**	0.339**	0.037	1			
Performance Satisfaction (PS)	0.967	3.06	0.932	-0.089	0.091*	0.155**	-0.182**	0.044	1		
Export intensity (EI)	0.956	2.74	1.342	0.553	0.004	0.493**	0.068	0.340**	-0.019	1	
Achievement of objectives (AO)	0.950	3.29	0.898	-0.087	0.118**	0.158**	-0.212**	0.042	0.866**	-0.016	1
* Correlation is significant at the 0.05 level (2 tailed)											
** Correlation is significant at the 0.01 level (2 tailed)											

**Table 6 Post-hoc performance metrics**

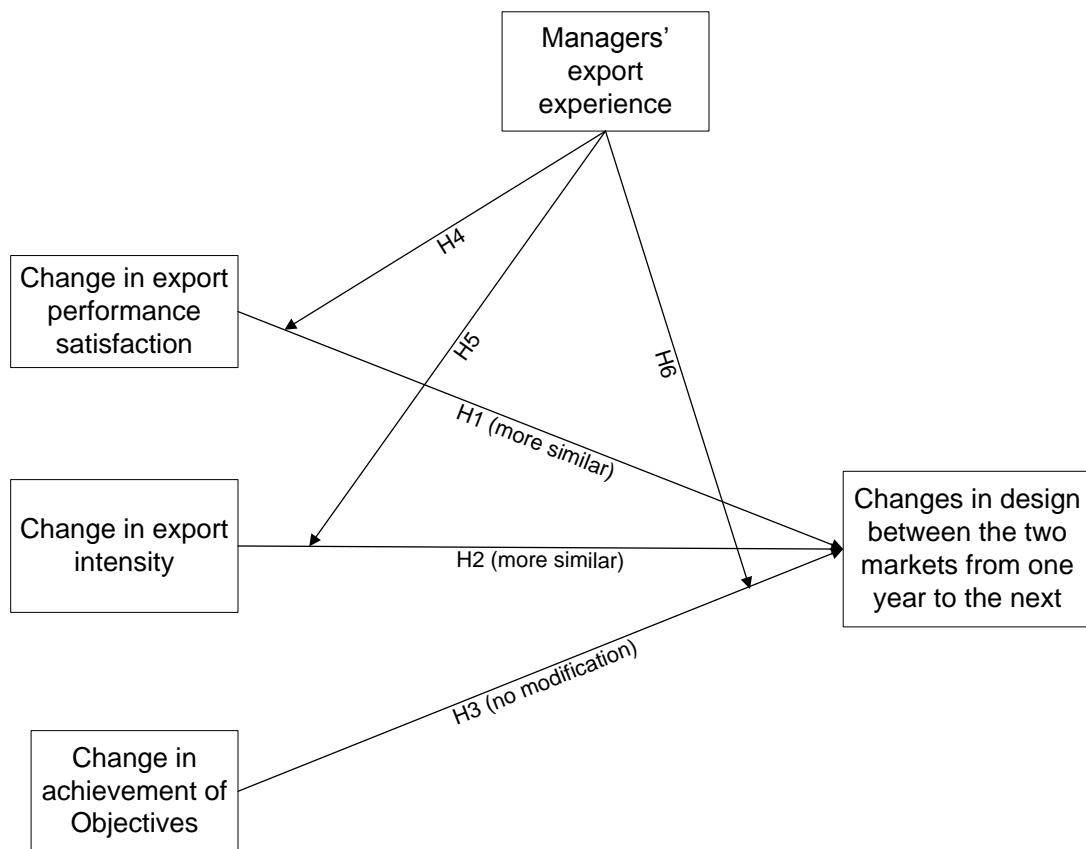
Performance Variable	All firms (127)*	Firms for which the export venture accounts for at least 60% of firm sales (35)
Achievement of export sales volume	0.31	0.73
Achievement of export sales revenue	0.32	0.63
Satisfaction with export sales volume	0.25	0.73
Satisfaction with export sales revenue	0.25	0.64
Export sales volume intensity	0.23	0.61
Export revenue intensity	0.23	0.58

\*Sample sizes are 124 and 126 for the intensity measures

**Table 7 Multinomial Logistic Regression. Dependent Variable: Product design change from year t-1 to t**

		Model 1		Model 2	
		B	Wald	B	Wald
1 More similar between the two markets	Intercept	-2.798**	12.209	-5.499	2.433
	Organizational Size (OS)	0.096	0.473	.080	0.292
	Value of the Exporting venture (VEV)	-0.059	0.312	0.051	0.147
	Price competitiveness (PC)	0.278	1.900	0.239	1.291
	Export Experience (EE)			0.949	1.029
	Performance Satisfaction (PS)			4.211**	5.054
	Export intensity (EI)			0.289	0.164
	Achievement of objectives (AO)			-3.045*	2.704
	PS*EE			-1.223**	5.993
	EI*EE			-0.116	0.361
	AO*EE			0.832*	2.976
2 More differentiated between the two markets	Intercept	-4.346**	30.548	-0.290	0.010
	Organizational Size (OS)	0.209	2.453	0.255	3.142
	Value of the Exporting venture (VEV)	0.034	0.116	0.098	0.579
	Price competitiveness (PC)	0.560**	8.740	0.555**	7.432
	Export Experience (EE)			-1.251	2.352
	Performance Satisfaction (PS)			0.721	0.287
	Export intensity (EI)			-1.155	3.800
	Achievement of objectives (AO)			-0.686	0.242
	PS*EE			-0.383	1.066
	EI*EE			0.357**	5.194
	AO*EE			0.312	0.681
Cox and Snell Pseudo R <sup>2</sup>		0.04		0.10	
Nagelkerke Pseudo R <sup>2</sup>		0.05		0.13	

\*\*p<0.05, \*p<0.10, Reference category: no modifications



**Figure 1 Summary of hypotheses**